

Rosemount™ 708 Wireless Acoustic Transmitter



WirelessHART IEC CE

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Rosemount™ 708 Wireless Acoustic Transmitter

| | |
|--|---------------|
| Rosemount 708 Hardware Revision | 1 |
| HART® Device Revision | 1 |
| Field Communicator Field Device Revision | Dev v1, DD v1 |

NOTICE

Read this manual before working with the product. For personal and system safety and for optimal product performance, understand the contents completely before installing, using, or maintaining this product.

Emerson™ has two toll-free assistance numbers and one international number.

Customer Central

1 800 999 9307 (7:00 a.m. to 7:00 p.m. CST)

National Response Center (equipment service needs)

1 800 654 7768 (24 hours a day)

International

1 952 906 8888

Part 15

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Nuclear qualification

The products described in this document are NOT designed for nuclear-qualified applications.

Using non-nuclear qualified products in applications that require nuclear-qualified hardware or products may cause inaccurate readings.

For information on Rosemount nuclear-qualified products, contact an Emerson Sales Representative.

Smart Wireless Gateway

The Rosemount 708 Transmitter and all other wireless devices should be installed only after the Smart Wireless Gateway has been installed and is functioning properly. Wireless devices should also be powered up in order of proximity from the Smart Wireless Gateway, beginning with the closest. This will result in a simpler and faster network configuration.

Use caution when making changes to the TCP/IP network settings. If they are lost or entered incorrectly, the Gateway will require a factory reset. Contact your network administrator for information on the proper TCP/IP network settings.

Hazardous substance

Individuals handling products exposed to hazardous substances can avoid injury if they are informed of, and understand the hazard. If the returned product was exposed to a hazardous substance as defined by OSHA, a copy of the Material Safety Data Sheet (MSDS) for each hazardous substance identified must accompany the returned goods.

NOTICE

Shipping considerations

The unit was shipped without the power module installed. Remove the power module prior to shipping.

Each power module contains one “D” size primary lithium battery. Primary lithium batteries are regulated in transportation by the U. S. Department of Transportation, and are also covered by the International Air Transport Association (IATA), International Civil Aviation Organization (CAO), and European Ground Transportation of Dangerous Goods (ARD). It is the shipper’s responsibility to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

The polymer enclosure has surface resistivity greater than one gigaohm. Take care during transportation to and from the configuration point to prevent a potential electrostatic charging hazard.

Power module considerations

Battery hazards remain when cells are discharged. Electrostatic discharge can damage electronics.

Power modules should be stored in a clean dry area. For maximum battery life, storage temperature should not exceed 30 °C (86 °F).

The power module may be placed in a hazardous area. The power module has surface resistivity greater than one gigaohm and must be properly installed in the wireless device enclosure. Take care during transportation to and from the installation point to prevent a potential electrostatic charging hazard.

Installation considerations

Only qualified personnel should perform the installation.

Verify the operating atmosphere of the transmitter is consistent with applicable hazardous area certifications. Reference the [Product Certifications](#) section of this manual for information regarding hazardous certification.

This device must be installed to ensure a minimum antenna separation distance of 20 cm (8 in.) from all persons.

▲ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

⚠ CAUTION

Install and tighten process connectors before applying pressure.

Avoid contact with the leads and terminals; high voltage that may be present on leads can cause electrical shock.

If the device is installed in a high-voltage environment and a fault condition or installation error occurs, high voltage may exist on transmitter leads and terminals.

Section 1 Introduction

1.1 Using this manual

The sections in this manual provide information on installing, operating, and maintaining the Rosemount™ 708 Acoustic Wireless Transmitter. The sections are organized as follows:

[Section 2: Configuration](#) provides instruction on commissioning and operating transmitters. Information on software functions, configuration parameters, and online variables is also included.

[Section 3: Installation](#) contains mechanical and electrical installation instructions, and field upgrade options.

[Section 4: Commissioning](#) contains techniques for properly commissioning the device.

[Section 5: Operation and Maintenance](#) contains operation and maintenance techniques.

[Section 6: Troubleshooting](#) provides troubleshooting techniques for the most common operating problems.

[Appendix A: Specifications and Reference Data](#) supplies reference and specification data, as well as ordering information.

[Appendix B: Product Certifications](#) contains intrinsic safety approval information, European ATEX directive information, and approval drawings.

[Appendix C: Recommended Practices](#) contains guidelines to achieve the best possible Smart Wireless Network.

1.2 Product recycling/disposal

Recycling of equipment and packaging should be taken into consideration and disposed of in accordance with local and national legislation/regulations.

Section 2 Configuration

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| Safety messages | page 3 |
| Device configuration | page 4 |
| Device network configuration | page 4 |
| Remove power module | page 6 |
| HART menu tree | page 6 |

2.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.
-

2.2 Device configuration

Remove the power module cover and connect to the HART® Communication terminals for configuration.

The Rosemount™ 708 Acoustic Wireless Transmitter will receive HART Communication from a Field Communicator or AMS™ Device Manager. When using a Field Communicator, any configuration changes must be sent to the transmitter using the **Send** key (F2). AMS Device Manager configuration changes are implemented when the **Apply** button is selected.

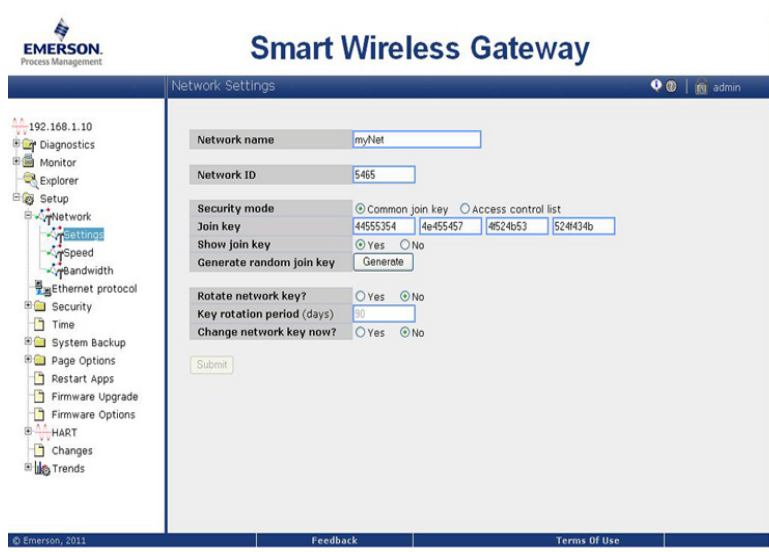
AMS Device Manager

AMS Device Manager is capable of connecting to devices directly, using a HART modem, or remotely using the Gateway. To configure the Rosemount 708 Transmitter, double click (or right click and select **Configure/Setup**) on the device icon that will appear below either the HART modem or Gateway connection tree.

2.3 Device network configuration

To communicate with the Gateway (and ultimately the host system), the transmitter must be configured to communicate with the wireless network. Using a Field Communicator or AMS Device Manager, enter the *network ID and join key* so they match the network ID and join key of the Gateway and other devices in the network. If they do not match, the acoustic transmitter will not communicate with the network. The network ID and join key may be obtained from the Gateway on the *Systems Settings>Network>Network Settings* page on the web server, shown in [Figure 2-1](#).

Figure 2-1. Gateway Network Settings



2.3.1 AMS Device Manager

Right click on the acoustic transmitter and select **Configure**. When the menu opens, select **Join Device to Network** and follow the method to enter the network ID and join key.

2.3.2 Field Communicator

The network ID and join key may be changed in the wireless device by using the following Fast Key sequence. Set both network ID and join key.

| Function | Key sequence | Menu items |
|------------------------|--------------|--------------------------|
| Join Device to Network | 2, 1, 2 | Network ID, Set Join Key |

2.3.3 Fast Key sequence

Table 2-1 lists the Fast Key sequence for common transmitter functions.

Table 2-1. Rosemount 708 Fast Key Sequence

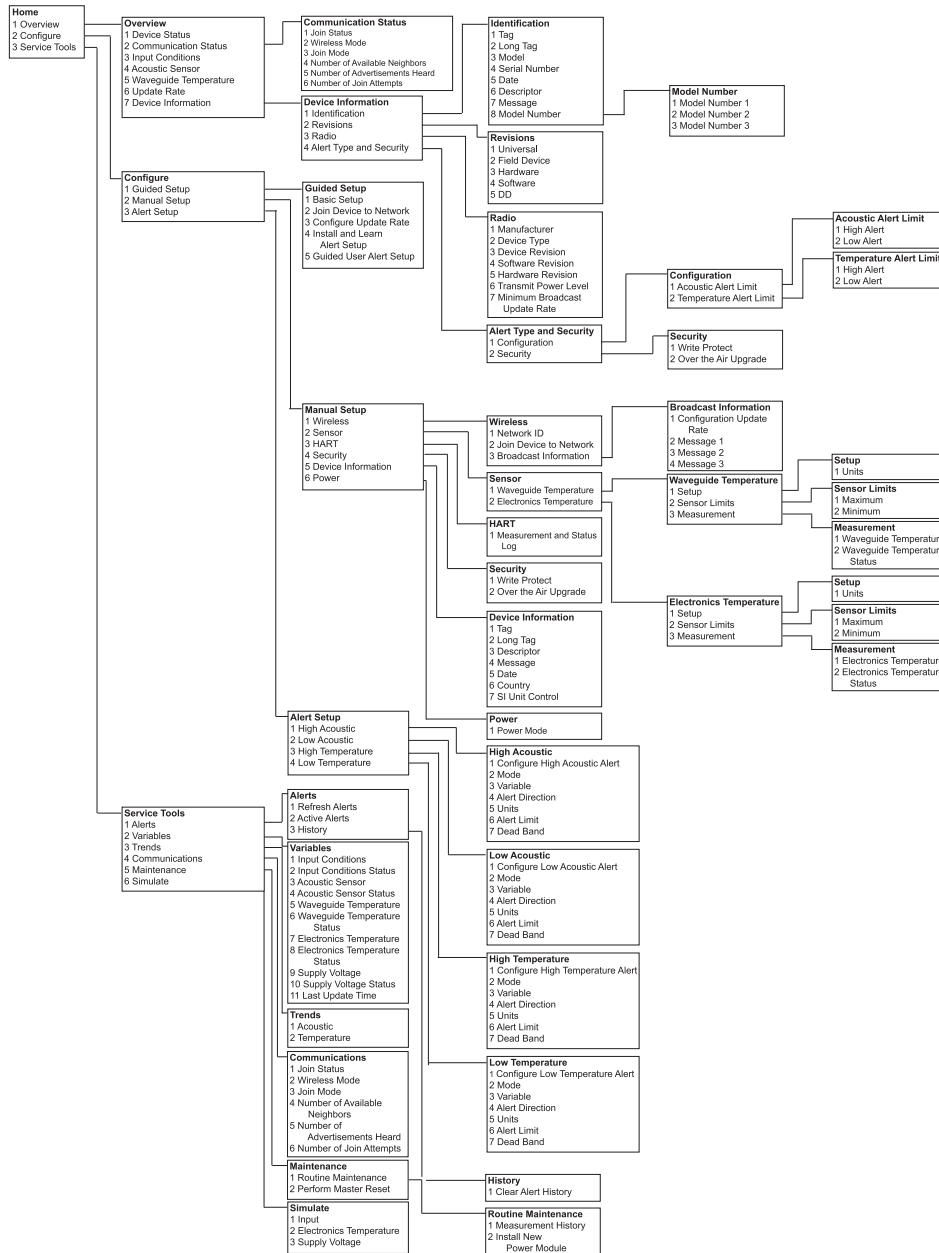
| Function | Key sequence | Menu items |
|--------------------|--------------|--|
| Device Information | 2, 2, 5 | Tag, Long Tag, Descriptor, Message, Date, Country, SI Unit Control |
| Guided Setup | 2, 1 | Basic Setup, Join Device to Network, Configure Update Rates, Alert Setup |
| Manual Setup | 2, 2 | Wireless, Sensor, HART, Security, Device Information, Power |
| Wireless | 2, 2, 1 | Network ID, Join Device to Network, Broadcast Information |

2.4 Remove power module

After the device has been configured, remove the power module and replace the power module cover. The power module should be inserted only when the device is ready for commissioning.

2.5 HART menu tree

Figure 2-2. Field Communicator Menu Tree



Section 3 Installation

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| Mounting | page 11 |

3.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

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Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.
-

3.2 Considerations

3.2.1 General

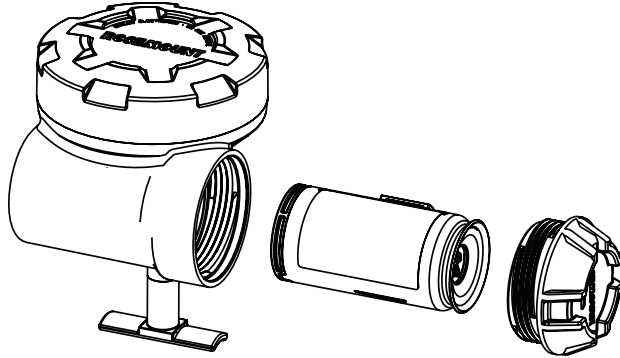
The Rosemount™ 708 Acoustic Wireless Transmitter measures the level of ultrasonic acoustic noise and waveguide temperature. The Rosemount 708 Transmitter converts the acoustic and temperature measurements into output data and alerts.

3.2.2 Wireless considerations

Power-up sequence

The Smart Wireless Gateway (Gateway) should be installed and functioning properly before any wireless devices are powered. Install the power module, SmartPower™ Solutions, model number 701PGN Green Power Module, into the Rosemount 708 Transmitter to power the device. This results in a simpler and faster network configuration. Enabling Active Advertising on the Gateway ensures new devices are able to join the network faster. For more information, see the Smart Wireless Gateway [Reference Manual](#).

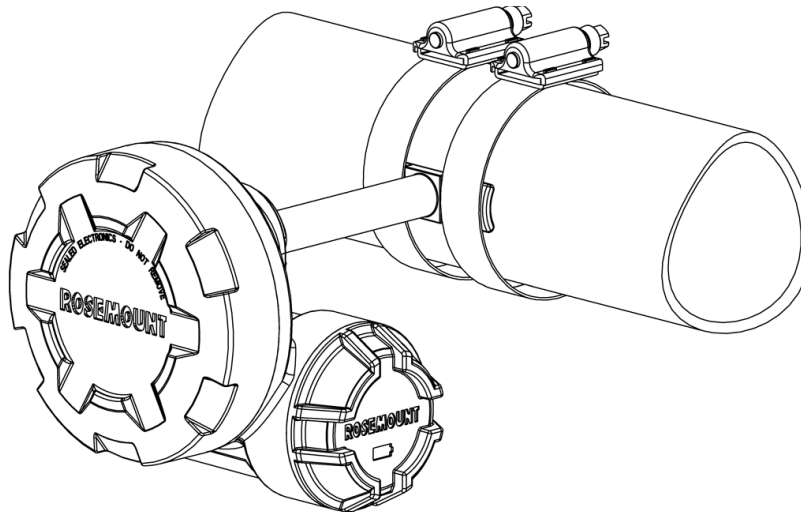
Figure 3-1. Power Module Installation



Antenna position

The antenna is internal to the acoustic transmitter. To achieve optimal range, position the transmitter with the waveguide horizontal and the power module closest to the ground as shown in [Figure 3-2](#). Good connectivity can also be achieved in other orientations. The antenna should also be approximately 1 m (3 ft.) from any large structure, building, or conductive surface to allow for clear communication to other devices. Refer to best practices for additional information on optimal mounting locations of device.

Figure 3-2. Antenna Position



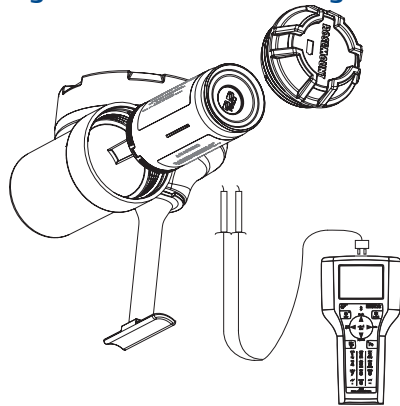
Recommended practices

When mounting the device, recommended practices should be considered to achieve the best wireless performance. See [Appendix C: Recommended Practices](#) for more information on recommended practices.

Field Communicator connections

The power module needs to be installed in the device for the Field Communicator to interface with the Rosemount 708 Transmitter. This transmitter uses the green power module; order model number 701PGN. Field communication with this device requires a HART®-based Field Communicator using the correct Rosemount 708 DD. Field Communicator connections are located on the power module. The power module is keyed and can only be inserted in one orientation. Refer to [Figure 3-3](#) for instructions on connecting the Field Communicator to the transmitter.

Figure 3-3. Connection Diagram



3.2.3 Mechanical

Location

When choosing a location and position, consider access to the power module compartment for easy power module replacement.

Electronics cover

The electronics cover is sealed and cannot be removed. Do not attempt to unscrew the cover.

3.2.4 Electrical

Power module

The Rosemount 708 Transmitter is self-powered. The power module contains one “D” size primary lithium/thionyl chloride battery. Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and are not reactive as long as the battery and the power module are maintained. Care should be taken to prevent thermal, electrical, or mechanical damage. Contacts should be protected to prevent premature discharge.

⚠ Use caution when handling the power module, it may be damaged if dropped from heights exceeding 6.10 m (20 ft).

3.2.5 Environmental

Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certification.

Temperature effects

The transmitter will operate within specifications for ambient temperatures between –40 and 85 °C (–40 and 185 °F).

Heat from the process is transferred to the transmitter housing. If the process temperature is high, the ambient temperature will need to be lower to account for heat transferred to the transmitter housing. See [Table 3-1](#) for ambient temperature derating. Refer to [Table 3-2](#) for High Temperature option (HT01) for ambient temperature derating.

Table 3-1. Ambient Temperature Derating

| Process temperature (°C) | Max ambient (°C) |
|--------------------------|------------------|
| 260 | 41 |
| 240 | 45 |
| 220 | 49 |
| 200 | 53 |
| 180 | 57 |
| 160 | 61 |
| 140 | 64 |
| 120 | 58 |
| 100 | 72 |
| 85 | 75 |

Table 3-2. Ambient Temperature Derating - HT01

| Process temperature (°C) | Max ambient (°C) |
|--------------------------|------------------|
| 550 | 41 |
| 520 | 45 |
| 490 | 47 |
| 460 | 49 |
| 430 | 51 |
| 400 | 53 |
| 370 | 56 |
| 340 | 58 |
| 310 | 60 |
| 280 | 62 |
| 260 | 63 |

3.2.6 Mounting installation considerations

1. Inspect mounting bands periodically and re-tighten if necessary. Some loosening may occur after initial installation due to thermal expansion/contraction.
2. Ensure the waveguide is in direct contact with the pipe.
3. Insulate process piping to minimize ambient temperature effects (see [Figure 3-8](#)). Insulation thickness over the top of the waveguide foot should not exceed 2.54 cm (1-in).
4. For best results, mount the transmitter within 15.24 cm (6 in.) of the equipment being monitored.
5. The stainless steel mounting bands could be affected by stress corrosion and potentially fail when in the presence of chlorides.
6. The transmitter should be installed such that steam or other high temperature fluids do not directly impinge the housing of the device.
7. If installing the device on a steam trap, the device should be installed on the upstream side of the trap.

3.3 Mounting

For high temperature mounting, see [Mounting in a high temperature application](#) .

1. Locate the Rosemount 708 Transmitter on a horizontal section of piping as close as possible to the equipment to be monitored. Align the waveguide of the transmitter as shown in [Figure 3-4](#)
2. Ensure the mounting location is free of foreign matter and corrosion to ensure good contact between the piping and waveguide.
3. Tighten each clamp to 10.2 N-m (90 in-lb). Trim the excess clamp band material to prevent unwanted acoustic noise.
4. If commissioning the device, install the power module (see [Figure 3-5 on page 12](#)).
5. Ensure the power module cover is fully tightened to prevent moisture ingress. The lip of the polymer power module cover should be in contact with the surface of the polymer enclosure to ensure a proper seal. Do not over tighten.

Figure 3-4. Transmitter Orientation

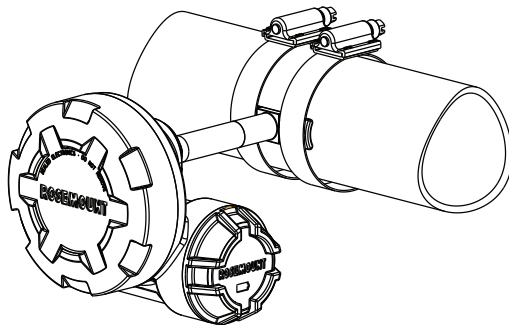
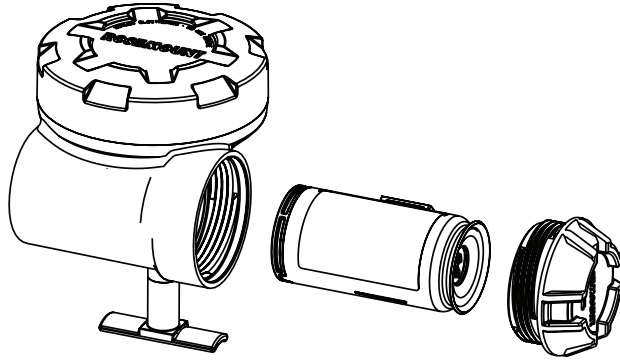


Figure 3-5. Power Module Installation



Note

Wireless devices should be powered up in order of proximity from the Gateway, beginning with the closest device to the Gateway. This will result in faster network formation.

3.3.1 Mounting in a high temperature application

High temperature mounting hardware should be used when process temperatures exceed 260 °C (500 °F).

1. Place the foot of the transmitter between the standoff mounting hardware plates as shown in [Figure 3-6](#).
2. Press standoff plates together so plates and transmitter foot are aligned.
3. Tighten each screw to 90 in-lb (10.2 N-m).
4. Locate the Rosemount 708 Transmitter and high temperature mounting hardware on a horizontal section of the piping as close as possible to the equipment being monitored.
5. Ensure the mounting location is free of foreign matter and corrosion to ensure good contact between the piping and mounting hardware.
6. Insert the U-bolt through the standoff mounting hardware.
7. Tighten each nut to 90 in-lb (10 N-m) [Figure 3-7](#).
8. If commissioning the device, install the power module (see [Figure 3-5](#)).
9. Ensure the power module cover is fully tightened to prevent moisture ingress. The lip of the polymer power module cover should be in contact with the surface of the polymer enclosure to ensure a proper seal. Do not over tighten.

Figure 3-6. High Temperature Mounting Hardware

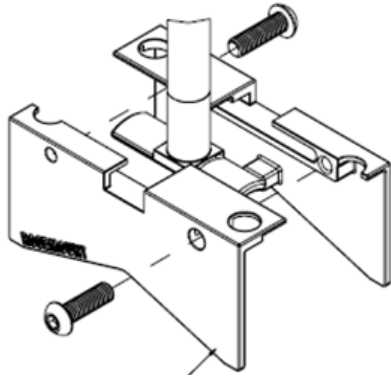
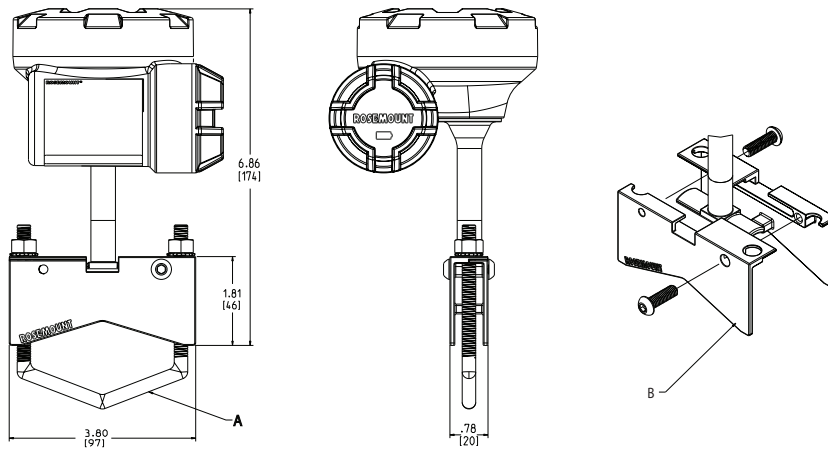
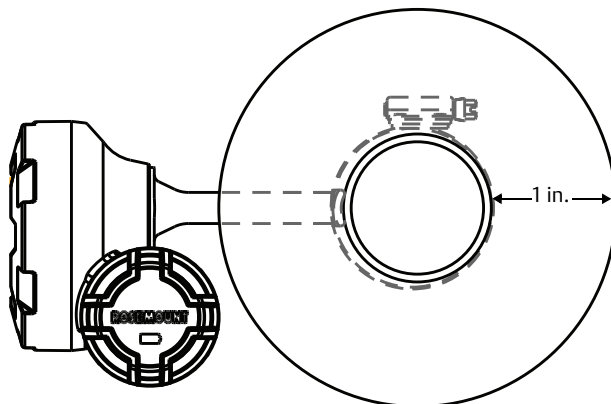


Figure 3-7. Rosemount 708 Transmitter with High Temperature Mounting Kit



A. For pipe sizes 0.5 to 2.5-in.
B. Bracket mounting
Dimensions are in inches (millimeters).

Figure 3-8. Piping, Insulation Side View



Section 4 Commissioning

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| Safety messages | page 15 |
| Verify operation | page 15 |

4.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.
-

4.2 Verify operation

There are three methods available to verify operation:

- Field Communicator
- Gateway's integrated web interface
- AMS™ Suite Wireless Configurator or AMS Device Manager

If the Rosemount 708 Transmitter was configured with the network ID and join key, and sufficient time has passed, the transmitter will be connected to the network. If network ID and join key were not configured, reference [“Troubleshooting” on page 17](#).

Note

It may take several minutes for the device to join the network.

4.2.1 Field Communicator

For *WirelessHART*® transmitter communication, a Rosemount 708 Device Driver (DD) is required. To obtain the latest DD, visit the Emerson™ Easy Upgrade site at: Emerson.com/Rosemount/Device-Install-Kits.

The communication status may be verified in the wireless device using the following Fast Key sequence.

| Function | Key sequence | Menu items |
|----------------|--------------|---|
| Communications | 3, 4 | Join Status, Wireless Mode, Join Mode, Number of Available Neighbors, Number of Advertisements Heard, Number of Join Attempts |

4.2.2 Smart Wireless Gateway

Using the Gateway's web interface, navigate to the Devices page as shown in [Figure 4-1](#). Locate the device in question and verify all status indicators are good (green).

Figure 4-1. Smart Wireless Gateway Explorer page

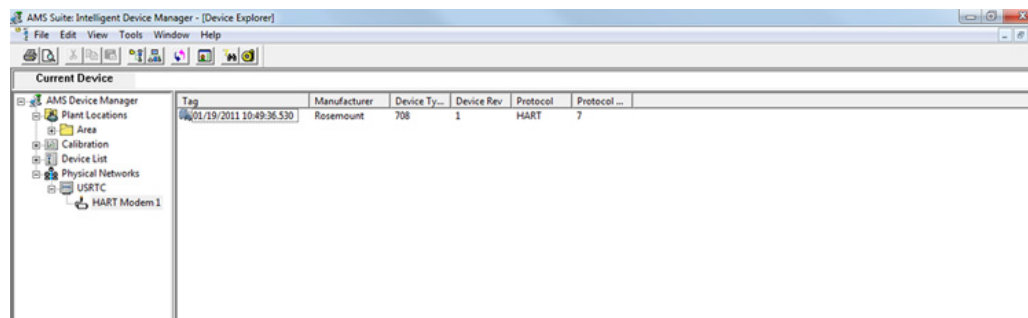
The screenshot shows the 'Smart Wireless Gateway Explorer' page. On the left is a navigation menu with 'Diagnostics', 'Monitor', 'Explorer', and 'Setup'. The main area contains a table with the following columns: HART Tag, HART status, Last update, PV, SV, TV, QV, and Burst rate. All status indicators are green.

| HART Tag | HART status | Last update | PV | SV | TV | QV | Burst rate |
|------------------|-------------|-------------------|--------------------------|--------------|------------------|-------------|------------|
| 2160 | ● | 01/26/11 15:10:53 | 1.000 | 1524.358 Hz | 73.400 DegF | 7.212 V | 8 |
| 3051S Pressure | ● | 01/26/11 15:10:53 | -0.025 InH2O 68F | 22.567 DegC | 22.500 DegC | 8.082 V | 8 |
| 648 Temperature | ● | 01/26/11 15:10:51 | 23.192 DegC | 23.173 DegC | 23.000 DegC | 8.467 V | 8 |
| 702 - Discrete 2 | ● | 01/26/11 15:10:50 | 0.000 | 0.000 | 22.750 DegC | 8.906 V | 4 |
| 702 Discrete | ● | 01/26/11 15:10:55 | 0.000 | 0.000 | 22.500 DegC | 8.085 V | 4 |
| 708 Acoustic | ● | 01/26/11 15:10:41 | 1.000 User Defined (240) | 24.071 DegC | 24.250 DegC | 3.432 V | 8 |
| 8732-INST | ● | 01/26/11 15:10:01 | 30.005 ft/s | 10001.571 Hz | 302646500.000 ft | 0.000 ft | 00:01:00 |
| 8732-THUM | ● | 01/26/11 15:10:01 | 27.500 DegC | | | | 00:01:00 |
| PT-222A-THUM | ● | 01/26/11 15:09:53 | 23.500 DegC | | | | 00:01:00 |
| VORTEX | ● | 01/26/11 15:10:53 | 23.440 DegC | 827.839 gal | 0.000 m/s | 0.000 Hz | 8...16 |
| rcc-rev4 | ● | 01/26/11 15:10:04 | 10.000 | 0.000 | 31.500 DegC | 32.000 DegC | |

AMS Device Manager

When the device has joined the network, it will appear in the AMS Device Manager as illustrated in [Figure 4-2](#). For *WirelessHART* transmitter communication, a Rosemount 708 DD is required. To obtain the latest DD, visit the Emerson Easy Upgrade site at: Emerson.com/Rosemount/Device-Install-Kits.

Figure 4-2. AMS Device Manager



Note

SteamLogic™ software is provided for viewing steam trap status. Refer to the manual on the CD for more information.

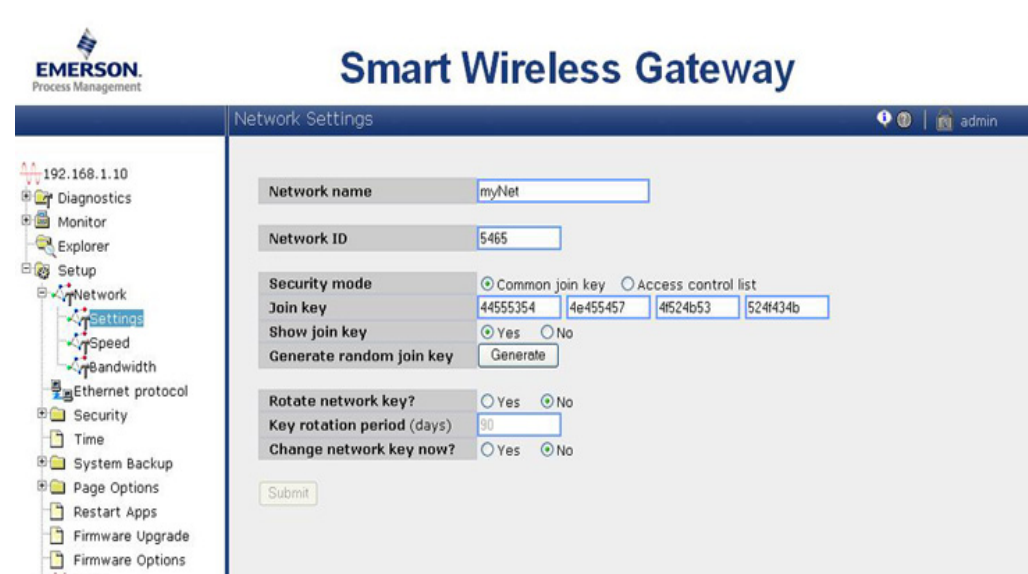
Troubleshooting

If the device is not joined to the network after power up, verify the correct configuration of the network ID and join key, and that Active Advertising has been enabled on the Gateway. The network ID and join key in the device must match the network ID and join key of the Gateway.

The network ID and join key may be obtained from the Gateway on the *System Settings>Network>Network Settings* page of the web server (see Figure 4-3 on page 17). The network ID and join key may be changed in the wireless device by following the Fast Key sequence shown below.

| Function | Key sequence | Menu items |
|------------------------|--------------|--------------------------|
| Join Device to Network | 2, 1, 2 | Network ID, Set Join Key |

Figure 4-3. Smart Wireless Gateway Network Settings



4.2.3 Field Communicator use

Note

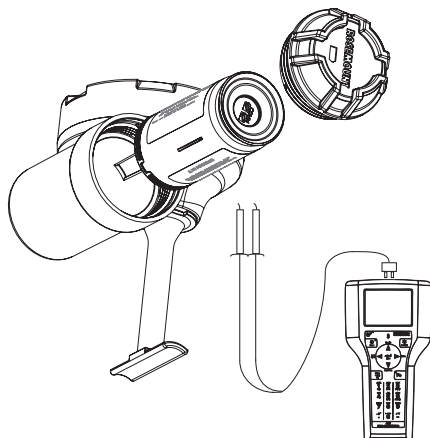
In order to establish communication with a Field Communicator, power the Rosemount 708 Transmitter by connecting the power module. For more information on the power module, refer to SmartPower™ Solutions [Product Data Sheet](#).

Table 4-1 includes Fast Key sequences frequently used to interrogate and configure the device.

Table 4-1. Rosemount 708 Fast Key Sequence

| Function | Key sequence | Menu items |
|--------------------|--------------|--|
| Device Information | 2, 2, 5 | Tag, Long Tag, Descriptor, Message, Date, Country, SI Unit Control |
| Guided Setup | 2, 1 | Basic Setup, Join Device to Network, Configure Update Rates, Alert Setup |
| Manual Setup | 2, 2 | Wireless, Sensor, HART, Security, Device Information, Power |
| Wireless | 2, 2, 1 | Network ID, Join Device to Network, Broadcast Information |

Figure 4-4. Field Communicator Connections



Section 5 Operation and Maintenance

| | |
|--------------------------------|---------|
| Safety messages | page 19 |
| Operation | page 19 |
| Alerts | page 20 |
| Power module replacement | page 23 |

5.1 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.
-

5.2 Operation

The Rosemount™ 708 Acoustic Wireless Transmitter measures ultrasonic acoustic energy and waveguide temperature. The acoustic level is reported in 'counts,' which are a relative indication of the magnitude. The sensor used in the Rosemount 708 Transmitter is sensitive to a broad range of frequencies to work in many different applications. The acoustic measurement or "count" in the transmitter is an average of the broad range of frequencies. No additional signal processing is performed to isolate specific frequencies.

This count information is used to determine the state of a steam trap, pressure relief valve, or other mechanical system. The device works similarly to a discrete device, looking for a large change in noise level occurs during a leak or release. In the case of steam traps, SteamLogic™ software calculates the steam trap state based on the acoustic and temperature information published by the Rosemount 708 Transmitter. See SteamLogic [Reference Manual](#) for further information.

When monitoring other equipment, the Rosemount 708 Transmitter may be configured with alerts to detect and communicate changes in the state of the system being monitored.

5.3 Alerts

The Rosemount 708 Transmitter can be configured to report alerts based on the acoustic and temperature level measured. The Rosemount 708 also reports diagnostic alerts when there is a device malfunction. For information on these alerts, refer to [Section 6: Troubleshooting](#). The following figures show how the AMS™ Device Manager overview screen looks for each of the alert conditions.

Figure 5-1. AMS Device Manager Overview Screen, Normal Conditions

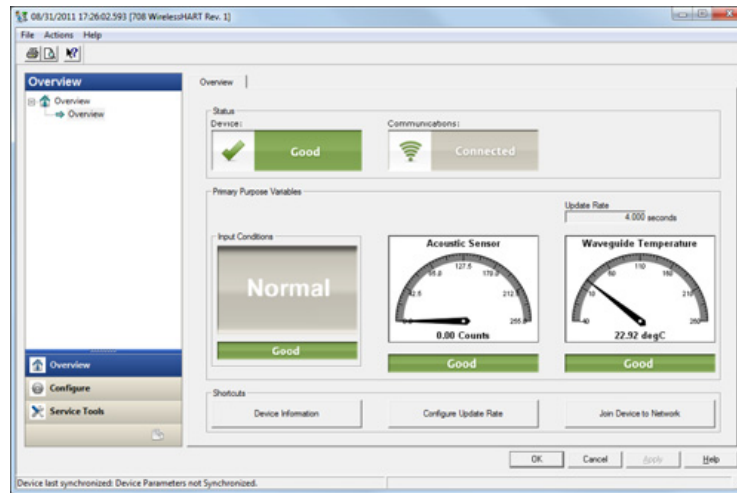
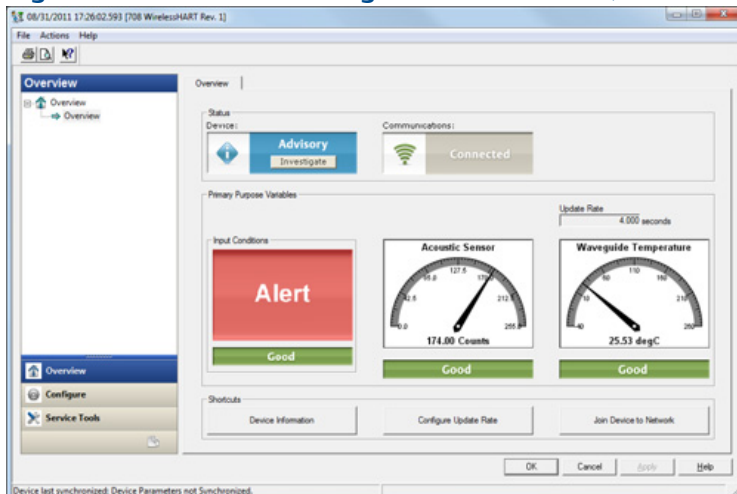


Figure 5-2. AMS Device Manager Overview Screen, Alert Conditions



5.3.1 Device alert configuration

Alert levels

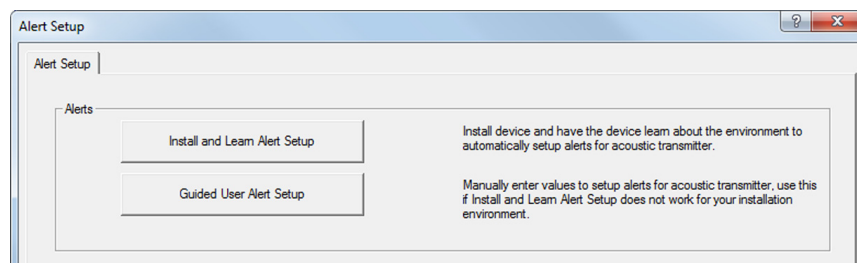
The Rosemount 708 Transmitter provides the following four user-configurable alerts:

- Acoustic High - triggers when acoustic level exceeds a user configured threshold
- Acoustic Low - triggers when acoustic level falls below a user configured threshold
- Temperature High - triggers when temperature level exceeds a user configured threshold
- Temperature Low - triggers when temperature level falls below a user configured threshold

Alert setup

The alerts are re configured using AMS Device Manager or a Field Communicator.

Figure 5-3. Alert Setup Screen

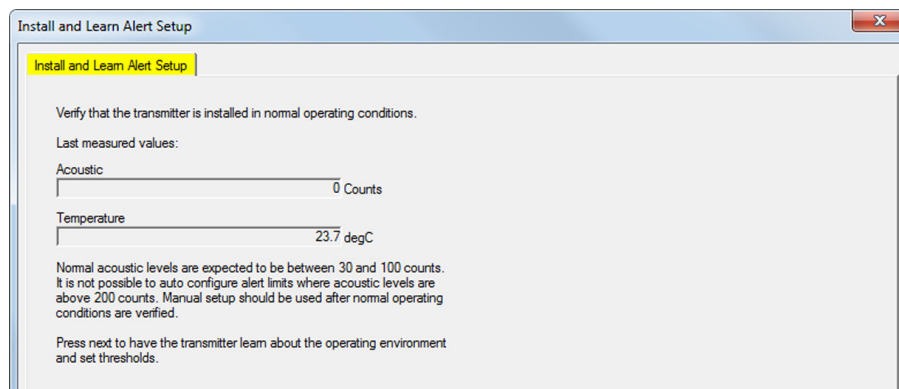


Install and learn

To use the install and learn function, the device must be installed and the equipment being monitored must be in its normal state. After configuration and operating conditions have been confirmed, go to the configuration menu under guided setup and select **Alert Setup**. This will launch a dialog menu (Figure 5-3 on page 21); select **Install and Learn Alert Setup**. The application will go through a series of steps to determine the current input conditions and set alerts based on this normal operation (Figure 5-4).

If the input conditions are too close to the high or low measurement device limits, the install and learn function will not be a good method to set the alert levels. In this case, check configuration conditions and verify the status is before continuing. If current input conditions do not allow for the install and learn function, use the [Manual](#) or [Guided user alert setup](#) to set alerts.

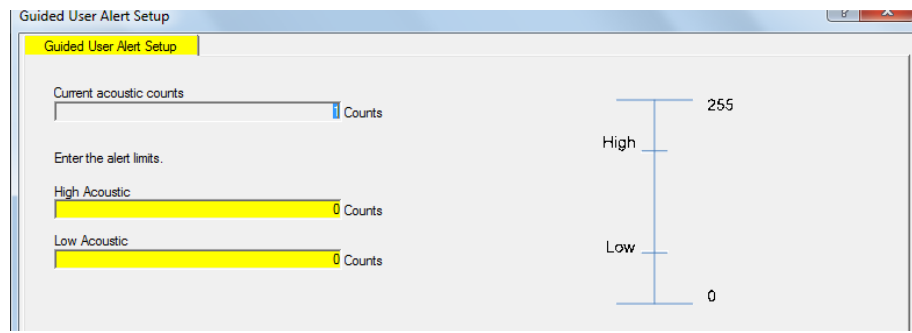
Figure 5-4. Install and Learn Alert Setup Screen



Guided user alert setup

Guided user alert setup cycles through on-screen prompts to set the alert levels. At each screen, the current level will be shown along with a field to enter the desired alert level as seen in Figure 5-5. To use the guided alert setup, navigate to the configuration menu under guided setup and select **Alert Setup**, then **Guided User Alert Setup**. Follow the on-screen prompts and enter the desired alert levels.

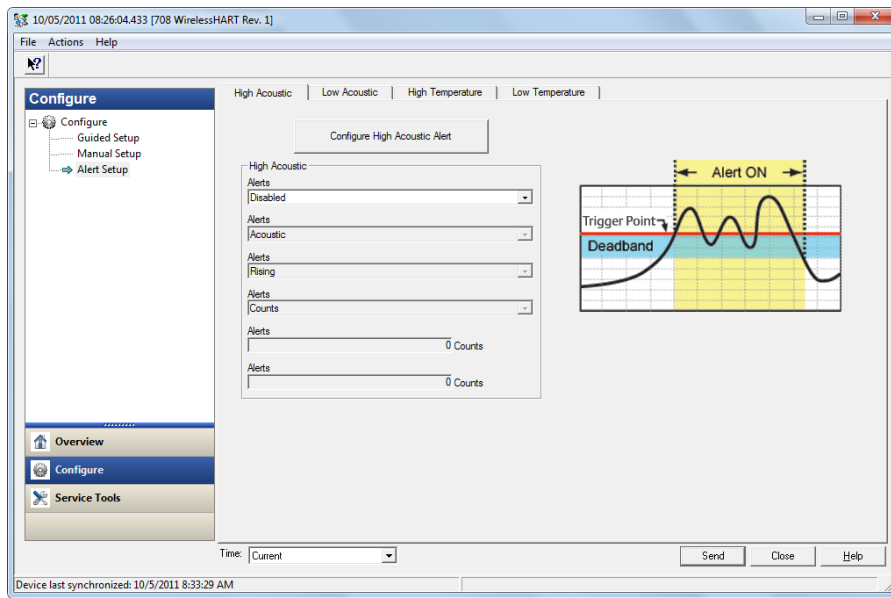
Figure 5-5. Guided User Alert Setup Screen



Manual

To manually set the alert levels, navigate to alerts the configuration menu and select **Alert Setup** under the main configuration menu. Enter the desired alert levels for each alert as shown in Figure 5-6.

Figure 5-6. Manual Alert Setup Screen



If a device is installed and shows an unexpected alert, verify the configuration conditions.

5.4 Power module replacement

Expected power module life is ten years at reference conditions.⁽¹⁾

1. Remove the power module cover and power module (SmartPower™ Solutions, model number 701PGN Green Power Module).
2. Replace the power module and the cover.
3. Ensure the power module cover is fully tightened to prevent moisture ingress. The lip of the polymer power module cover contact the surface of the polymer enclosure to ensure a proper seal. Do not over tighten.

5.4.1 Handling considerations

The green power module contains one “D” size primary lithium/thionyl chloride battery. Each battery contains approximately 5.0 grams of lithium. Under normal conditions, the battery materials are self-contained and not reactive as long as the batteries and battery pack integrity are maintained. Be careful to prevent thermal, electrical, or mechanical damage. Protect contacts to prevent premature discharge.

- ⚠ Use caution when handling the power module; it may be damaged if dropped from heights in exceeding 6.1 meters (20 feet).

Battery hazards remain when cells are discharged.

Environmental considerations

As with any battery, local environmental rules and regulations should be consulted to properly manage spent batteries. If no specific requirements exist, recycling through a qualified recycler is encouraged. Consult the materials safety data sheet for battery-specific information.

Shipping considerations

The unit was shipped without the power module installed. Remove the power module prior to shipping.

Each power module contains one “D” size primary lithium battery. Primary lithium batteries are regulated in transportation by the U. S. Department of Transportation, and are also covered by the International Air Transport Association (IATA), International Civil Aviation Organization (CAO), and European Ground Transportation of Dangerous Goods (ARD). It is the shipper’s responsibility to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

1. Reference conditions are 21 °C (70 °F), transmit rate of once per minute, and routing data for three additional network devices.

Section 6 Troubleshooting

| | |
|-----------------------|---------|
| Overview | page 25 |
| Safety messages | page 25 |

6.1 Overview

Table 6-1 provides summarized maintenance and troubleshooting suggestions for the most common operating problems.

If you suspect malfunction without diagnostic messages displayed, follow the procedures in this section to verify transmitter hardware and process connections are in good working order. Always verify the most likely checkpoints first.

6.2 Safety messages

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that potentially raises safety issues is indicated by a warning symbol (⚠). Refer to the following safety messages before performing an operation preceded by this symbol.

⚠ WARNING

Failure to follow these installation guidelines could result in death or serious injury.

- Only qualified personnel should perform the installation.

Explosions could result in death or serious injury.

- Before connecting a Field Communicator in an explosive atmosphere, make sure the instruments are installed in accordance with intrinsically safe or non-incendive field wiring practices.
- Verify the operating atmosphere of the transmitter is consistent with the appropriate hazardous locations certifications.

Electrical shock could cause death or serious injury.

- Use extreme caution when making contact with the leads and terminals.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation.

- This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.
-

Table 6-1. Maintenance and Troubleshooting Suggestions

| Symptom | Corrective actions |
|---|---|
| Device troubleshooting | |
| Electronics Failure | <ol style="list-style-type: none"> 1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If the condition persists, replace the device. |
| Acoustics Failure | <ol style="list-style-type: none"> 1. Reset the device. 2. If the condition persists, replace the device. |
| Waveguide Temperature Failure | <ol style="list-style-type: none"> 1. Reset the device. 2. If the condition persists, replace the device. |
| Radio Failure | <ol style="list-style-type: none"> 1. Reset the device. 2. If the condition persists, replace the device. |
| Supply Voltage Failure | <ol style="list-style-type: none"> 1. Replace the power module. 2. If the condition persists, replace the device. |
| Electronics Warning | <ol style="list-style-type: none"> 1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If the condition persists, replace the device. |
| Acoustics exceeded the limits | <ol style="list-style-type: none"> 1. Check process for possible saturation condition. 2. Reset the device. 3. If the condition persists, replace the device. |
| Electronics Temperature exceeded the limits | <ol style="list-style-type: none"> 1. Verify ambient temperature is within the transmitter's range. 2. Reset the device. 3. If the condition persists, replace the device. |
| Waveguide Temperature exceeded the limits | <ol style="list-style-type: none"> 1. Verify process temperature is within the transmitter's range. 2. Reset the device. 3. If the condition persists, replace the device. |
| Supply Voltage Low | <ol style="list-style-type: none"> 1. Replace the power module. |
| Database Memory Warning | <ol style="list-style-type: none"> 1. Reset the device. 2. Reconfirm all configuration items in the device. 3. If logging dynamic data not needed, this advisory can be safely ignored. |
| Simulation Active | <ol style="list-style-type: none"> 1. Verify that simulation is no longer required. 2. Disable Simulation mode in Service Tools. 3. Reset the device. |
| Short Battery Life | <ol style="list-style-type: none"> 1. Check that <i>Power Always On</i> mode is off. 2. Verify device is not installed in extreme temperatures. 3. Verify that device is not a network pinch point. |
| Configuration troubleshooting | |
| Cannot configure the device with Field Communicator or AMS Device Manager | <ol style="list-style-type: none"> 1. Power cycle the device. 2. Verify/replace power module. 3. Refer to AMS Wireless Configurator and/or handheld configuration tool manual for further troubleshooting. |
| Wireless troubleshooting | |
| Poor wireless connectivity | <ol style="list-style-type: none"> 1. Verify device oriented for optimal connections. 2. Verify wireless network best practices are followed (See Appendix C: Recommended Practices for more information). |
| Acoustic Transmitter not joining network | <ol style="list-style-type: none"> 1. Verify the device has power. 2. Verify the device is within effective communications range. 3. Verify the proper Network ID has been entered into the device. 4. See troubleshooting section of the Smart Wireless Gateway Reference Manual for more information. |
| Limited Bandwidth Error | <ol style="list-style-type: none"> 1. Use the slowest acceptable update rate. 2. Increase communication paths by adding more wireless points. 3. Check that the device has been online for at least an hour. 4. Create a new network with an additional Smart Wireless Gateway. |

6.3 Service support

Within the United States, call the Emerson™ Instrument and Valve Response Center using the 1-800-654-RSMT (7768) toll-free number. This center, available 24 hours a day, will assist you with any needed information or materials.

The center will ask for product model and serial numbers, and will provide a Return Material Authorization (RMA) number. The center will also ask for the process material to which the product was last exposed.

For inquiries outside of the United States, contact the nearest Emerson representative for RMA instructions.

To expedite the return process outside of the United States, contact the nearest Emerson representative.

⚠ CAUTION

Individuals who handle products exposed to a hazardous substance can avoid injury if they are informed of and understand the hazard. The product being returned will require a copy of the required Material Safety Data Sheet (MSDS) for each substance must be included with the returned goods.

Emerson Instrument and Valve Response Center representatives will explain the additional information and procedures necessary to return goods exposed to hazardous substances.

Appendix A Specifications and Reference Data

| | |
|--------------------------------------|---------|
| Functional specifications | page 29 |
| Physical specifications | page 29 |
| Performance specifications | page 30 |
| Wireless output specifications | page 30 |
| Dimensional drawings | page 31 |
| Ordering information | page 32 |

A.1 Functional specifications

A.1.1 Output

IEC 62591 (*WirelessHART*®) 2.4 GHz DSSS

A.1.2 Humidity limits

0–100 percent relative humidity

A.1.3 Transmit rate

User selectable one second to 60 minutes

A.1.4 Radio frequency power output from antenna

Internal (WP option) antenna: Maximum of 10 mW (10 dBm) EIRP

A.2 Physical specifications

A.2.1 Electrical connections/power module

- Replaceable, non-rechargeable, Intrinsically Safe Lithium-Thionyl Chloride power module pack with PBT/PC enclosure
- Ten year power module life at reference conditions⁽¹⁾

A.2.2 Field Communicator connections

Communication Terminals - Clips permanently fixed to power module

A.2.3 Materials of construction

Housing

PBT/PC

Cover O-ring

Silicone

Wave guide

Machined 316L SST

A.2.4 Mounting

Transmitters are directly attached to process piping using two stainless steel mounting bands.

A.2.5 Weight

Rosemount™ 708 Acoustic Wireless Transmitter with power module - 0.595 kg (1.31 lb)

Rosemount 708 Transmitter without power module - 0.445 kg (0.98 lb)

A.2.6 Enclosure ratings

NEMA® 4X and IP66/67

1. Reference conditions are 21 °C (70 °F), transmit rate of once per minute, and routing data for three additional network devices.

A.3 Performance specifications

A.3.1 Vibration effect

Tested per the requirements of IEC60770-1 field or pipeline with high vibration level (10–60 Hz 0.21 mm displacement peak amplitude/60–2000 Hz 3g)

A.3.2 Temperature limits

Ambient Limit: –40 to 85 °C (–40 to 185 °F)

Storage Limit: –40 to 85 °C (–40 to 185 °F)

Table A-1. Temperature Derating

| Process temperature (°C) | Max ambient (°C) |
|--------------------------|------------------|
| 260 | 41 |
| 240 | 45 |
| 220 | 49 |
| 200 | 53 |
| 180 | 57 |
| 160 | 61 |
| 140 | 64 |
| 120 | 58 |
| 100 | 72 |
| 85 | 75 |

Table A-2. High Temperature

| Process temperature (°C) | Max ambient (°C) |
|--------------------------|------------------|
| 550 | 41 |
| 520 | 45 |
| 490 | 47 |
| 460 | 49 |
| 430 | 51 |
| 400 | 53 |
| 370 | 56 |
| 340 | 58 |
| 310 | 60 |
| 280 | 62 |
| 260 | 63 |

A.3.3 Electromagnetic Compatibility (EMC)

All models meet all relevant requirements of EN 61326-2-3:2006.

A.4 Wireless output specifications

A.4.1 Acoustic level output

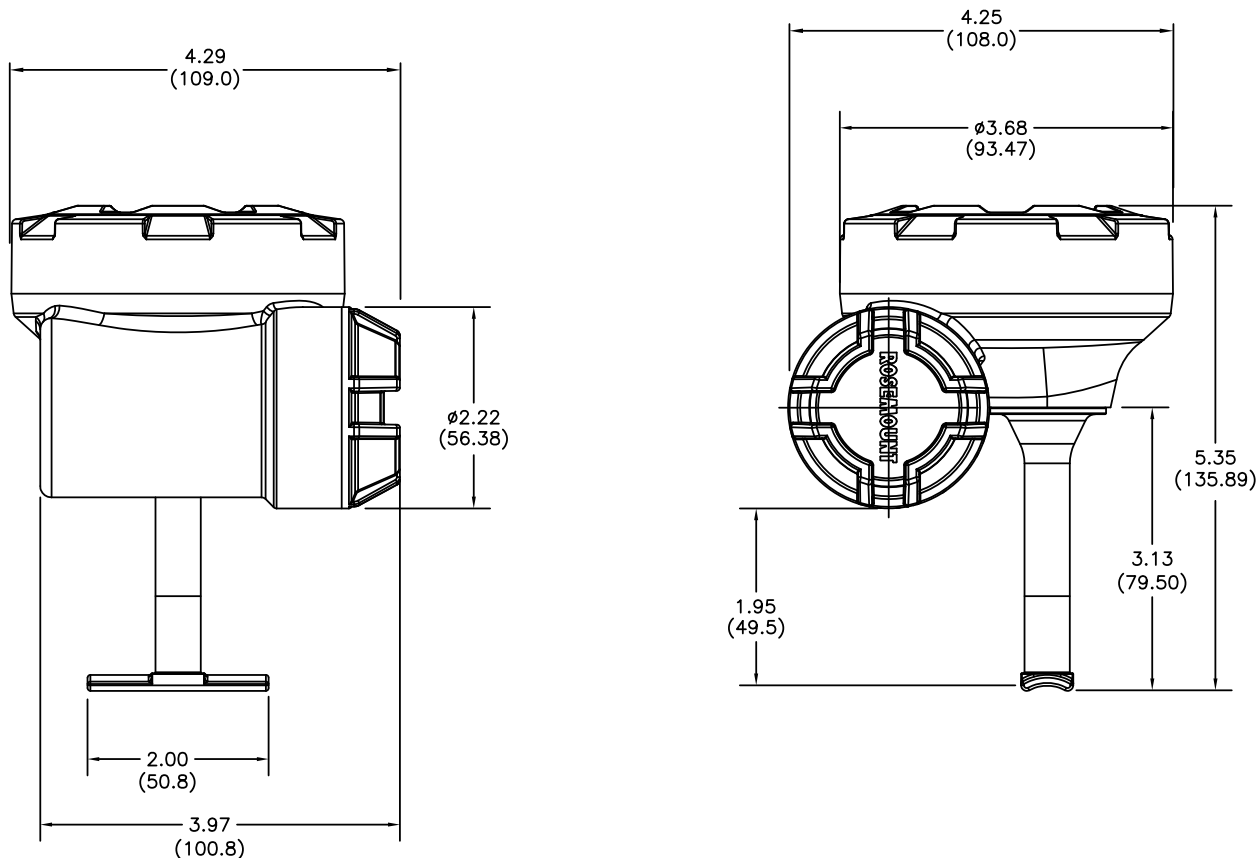
0–255 counts

A.4.2 Temperature output

–40 to 260 °C (–40 to 500 °F)

A.5 Dimensional drawings

Figure A-1. Rosemount 708 Transmitter Direct Mount



Dimensions are in inches (millimeters).

A.6 Ordering information

Table A-3. Rosemount 708 Acoustic Transmitter Ordering Information

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

| Model | Product description | |
|--------------------------------|--|---|
| 708 | Acoustic transmitter | ★ |
| Output protocol | | |
| X | Wireless | ★ |
| Measurement | | |
| 1 | Steam traps with SteamLogic™ software | ★ |
| 2 | Other measurements | ★ |
| Housing | | |
| P | Engineered polymer | ★ |
| Waveguide configuration | | |
| A1 | Acoustic Waveguide | ★ |
| Product certifications | | |
| NA | No hazardous location approval | ★ |
| I1 | ATEX Intrinsic Safety | ★ |
| I2 | INMETRO Intrinsic Safety | ★ |
| I5 | FM Intrinsically Safe | ★ |
| I6 | CSA Intrinsically Safe | ★ |
| I7 | IECEx Intrinsic Safety | ★ |
| Mounting hardware | | |
| NA00 | No mounting hardware | ★ |
| HC01 | Stainless steel mounting band, pipe size 1/2- to 2 1/2-in. | ★ |
| HC02 | Stainless steel mounting band, pipe size 3- to 4-in. | ★ |
| HC03 | Stainless steel mounting band, pipe size 4- to 10-in. | ★ |
| HT01 | High temperature stainless steel mounting hardware, pipe size 1/2- to 2 1/2-in. (260 to 550 °C). | |

Wireless options (include with selected model number)

| Wireless update rate, operating frequency and protocol | | |
|--|--|---|
| WA3 | User configurable update rate, 2.4 GHz DSSS, IEC 62591 (<i>WirelessHART</i>) | ★ |
| Omni-directional wireless antenna and SmartPower™ Solutions⁽¹⁾ | | |
| WP5 | Internal antenna, compatible with green power module (I.S. power module sold separately) | ★ |

Table A-3. Rosemount 708 Acoustic Transmitter Ordering Information

The starred offerings (★) represent the most common options and should be selected for best delivery. The non-starred offerings are subject to additional delivery lead time.

| Configuration | | |
|---|--|---|
| C1 | Factory configure date, descriptor, message fields and wireless parameters | ★ |
| Typical model number: 708 X 1 P A1 NA HC01 WA3 WP5 | | |

1. Power module must be shipped separately, order 701PGN.

Appendix B Product Certifications

Rev 2.1

| | |
|---------------------------------------|---------|
| European Directive Information | page 35 |
| Telecommunication compliance | page 35 |
| FCC and IC | page 35 |
| Ordinary Location Certification | page 35 |
| Installing in North America | page 35 |

B.1 European Directive Information

A copy of the EU Declaration of Conformity can be found at the end of the Quick Start Guide. The most recent revision of the EU Declaration of Conformity can be found at Emerson.com/Rosemount.

B.2 Telecommunication compliance

All wireless devices require certification to ensure that they adhere to regulations regarding the use of the RF spectrum. Nearly every country requires this type of product certification. Emerson is working with governmental agencies around the world to supply fully compliant products and remove the risk of violating country directives or laws governing wireless device usage.

B.3 FCC and IC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation. This device must be installed to ensure a minimum antenna separation distance of 20 cm from all persons.

B.4 Ordinary Location Certification

As standard, the transmitter has been examined and tested to determine that the design meets the basic electrical, mechanical, and fire protection requirements by a nationally recognized test laboratory (NRTL) as accredited by the Federal Occupational Safety and Health Administration (OSHA).

B.5 Installing in North America

The US National Electrical Code® (NEC) and the Canadian Electrical Code (CEC) permit the use of Division marked equipment in Zones and Zone marked equipment in Divisions. The markings must be suitable for the area classification, gas, and temperature class. This information is clearly defined in the respective codes.

B.6 USA

- I5** U.S.A Intrinsically Safe (IS)
Certificate: (FM) 3043245
Standards: FM Class 3600 – 1998,
FM Class 3610 – 2010,
FM Class 3810 – 2005,
NEMA® 250 – 2003,
ANSI/IEC 60529 - 2004
Markings: IS CL I, DIV 1, GPA, B, C, D T4; CL 1, Zone 0
AEx ia IIC T4; T4(-40 °C ≤ T_a ≤ +70 °C) when
installed per Rosemount™ drawing
00708-1000; Type 4X

Special Conditions for Safe Use (X):

1. The Rosemount 708 Wireless Acoustic Transmitter shall only be used with the 701PGNKF Rosemount SmartPower™ Battery Pack.
2. Potential Electrostatic charging Hazard – See Instructions.

B.7 Canada

- I6** Canada Intrinsically Safe
Certificate: (CSA) 2439890
Standards: CAN/CSA C22.2 No. 0-M91, CAN/CSA C22.2 No. 94-M91, CSA Std C22.2 No. 142-M1987, CSA Std C22.2 No. 157-92, CSA Std C22.2 No. 60529:05
Markings: I.S. CL I, DIV 1, GP A, B, C, D when installed per Rosemount drawing 00708-1001; T3C; Type 4X

B.8 Europe

- I1** ATEX Intrinsic Safety
Certificate: Baseefa11ATEX0174X
Standards: EN 60079-0: 2012, EN 60079-11: 2012
Markings: Ⓔ II 1 G Ex ia IIC T4 Ga, T4(-40 °C ≤ T_a ≤ +70 °C)

Special Conditions for Safe Use (X):

1. The plastic enclosure of the Rosemount 708 may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.
2. The Rosemount 701PGNKF Power Module may be replaced in a hazardous area. The power module has a surface resistivity greater than 1GΩ and must be properly installed in the wireless device enclosure. Care must be taken during transportation to and from the point of installation to prevent electrostatic charge build-up.

B.9 International

- I7** IECEx Intrinsic Safety
Certificate: IECEx BAS 11.0091X
Standards: IEC 60079-0: 2011, IEC 60079-11: 2011
Markings: Ex ia IIC T4 Ga, T4(-40 °C ≤ T_a ≤ +70 °C)

Special Condition for Safe Use (X):

1. The plastic enclosure of the Rosemount 708 may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth.

B.10 Brazil

- I2** INMETRO Intrinsic Safety
Certificate: UL-BR 16.0128X
Standards: ABNT NBR IEC 60079-0:2008 + Errata 1:2011, ABNT NBR IEC 60079-11:2009
Markings: Ex ia IIC T4 Ga, T4(-40 °C ≤ T_a ≤ +70 °C)

Special Condition for Safe Use (X):

1. See certificate for special conditions.

B.11 China

- I3** China Intrinsic Safety
Certificate: GYJ13.1445X
Standards: GB3836.1-2010, GB3836.4-2010, GB3836.20-2010
Markings: Ex ia IIC Ga T4, -40 ~ +70 °C

Special Condition for Safe Use (X):

1. See certificate for special conditions.

B.12 Japan

- I4** TIIS Intrinsically Safe
Certificate: TC20395
Markings: Ex ia IIC T4 X (-20 ~ +60 °C)

Special Condition for Safe Use (X):

1. See certificate for special conditions.

B.13 EAC – Belarus, Kazakhstan, Russia

- IM** Technical Regulation Customs Union (EAC) Intrinsic Safety
Certificate: RU C-US.Gb05.B.00643
Markings: 0Ex ia IIC T4 Ga X T4 (-40 °C ≤ T_a ≤ +70 °C)

Special Condition for Safe Use (X):

1. See certificate for special conditions.

B.14 Korea

IP Korea Intrinsic Safety
Certificate: 13-KB4BO-0145X
Markings: Ex ia IIC T4 T4 ($-40\text{ °C} \leq T_a \leq +70\text{ °C}$)

Special Condition for Safe Use (X):

1. See certificate for special conditions.

Appendix C Recommended Practices

Follow all recommended practices to ensure highest data reliability. Deviation from these best practices may require device repeaters in the network to maintain 99 percent data reliability. Follow these guidelines to achieve the best possible Smart Wireless Network:

1. Scope each wireless network field to a single process unit.
2. Minimize the number of hops to the Gateway to reduce latency. Contain a minimum of five wireless instruments within effective range of the Smart Wireless Gateway.
3. Have at least three devices with potential communication paths. For stronger performance, increase the required number of wireless neighbor devices to four or five. This increases the number of potential paths and optimizes network performance.
4. Have 25 percent of wireless instruments in the network within range of Smart Wireless Gateway. Other enhancing modifications include creating a higher percentage of devices within effective range of the Gateway to 35 percent or more. This clusters more devices around the Gateway and ensures fewer hops and more bandwidth available to *WirelessHART*® devices with fast scan rates.
5. Minimize the path distance from the Gateway. For better performance, the path is typically within range of one or two hops. This will utilize path redundancy and create very short transit times.
6. Determine effective range by type of process unit and density of the infrastructure surrounding the network.

C.1 Effective range

Heavy Obstruction: 100 ft. (30 m)—Typical heavy density plant environment; a truck or equipment cannot be driven through this.

Medium Obstruction: 250 ft. (76 m)—Typical light process areas; lots of space between equipment and infrastructure.

Light Obstruction: 500 ft. (152 m)—Typical of tank farms; despite tanks being big obstructions themselves, lots of space between and above makes for good RF propagation.

Line of Sight: 750 ft. (230 m)—No obstructions between *WirelessHART*® devices and devices mounted a minimum of 6 ft. (2 m) above ground or obstructions.

For examples and complete explanations, refer to the IEC62591 *WirelessHART* System [Engineering Guide](#).

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